

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Lofland 22T-402**

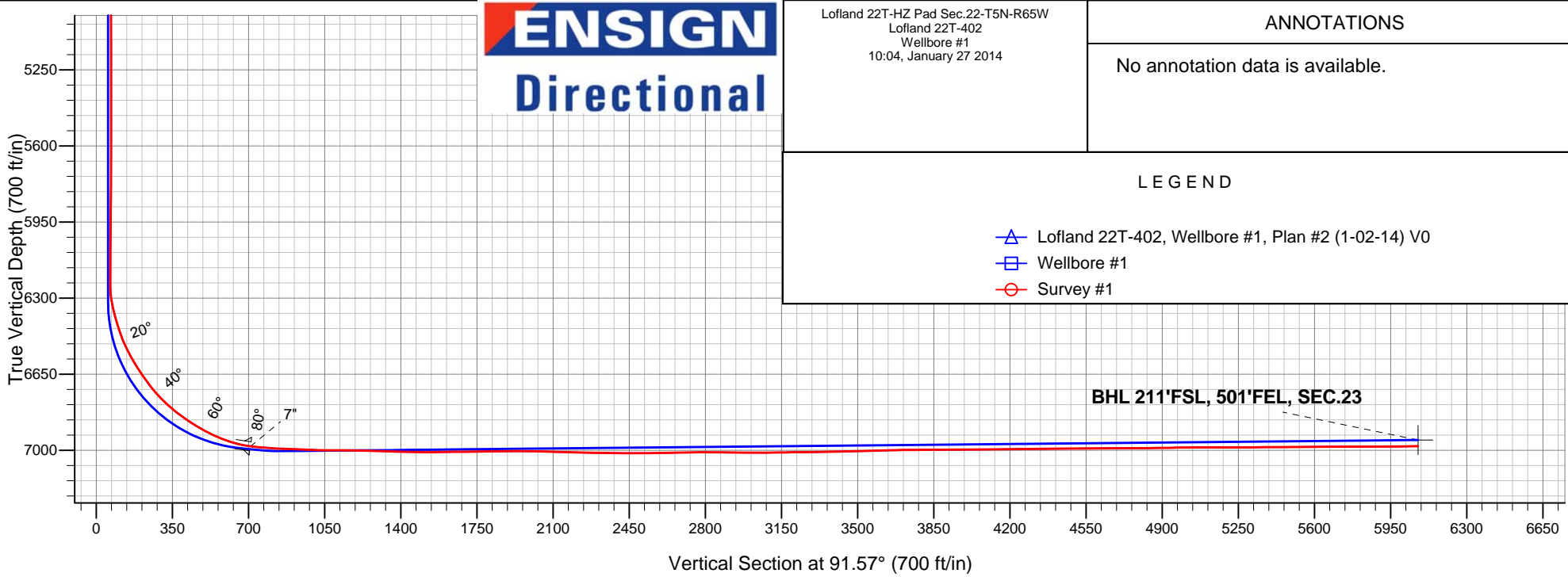
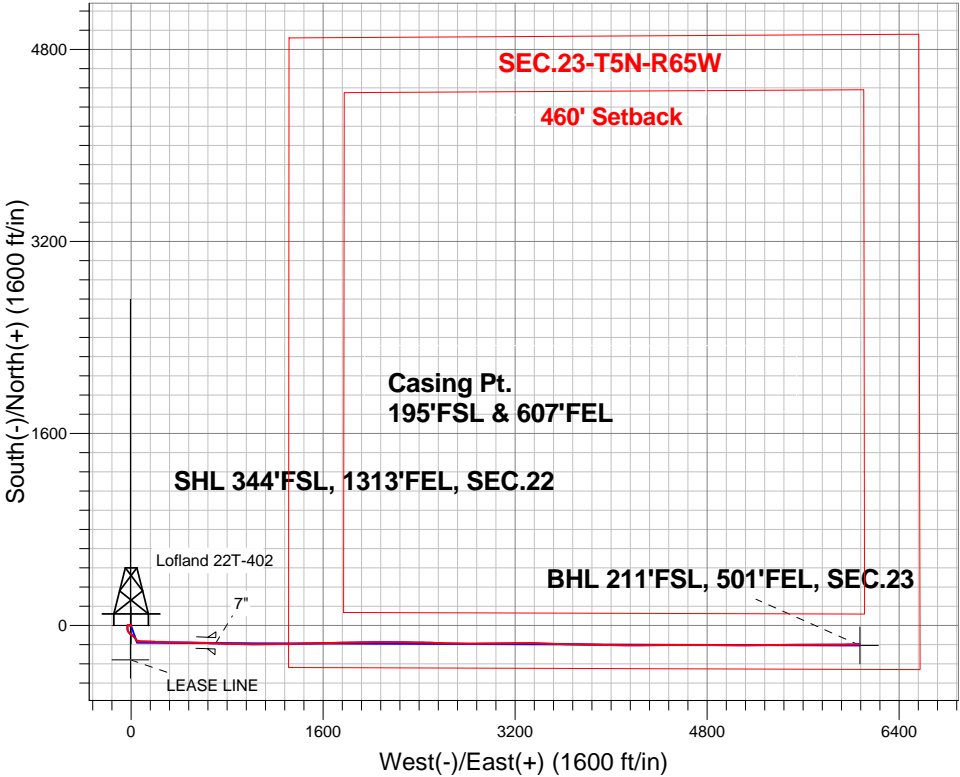
Surface Location: Lofland 22T-HZ Pad Sec.22-T5N-R65W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4648.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1381862.82	3238304.19	40.378460	-104.644620	
Ensign Rig #14 - RKB - 15' WELL @ 4663.0ft (Ensign Rig #14 - RKB - 15')						

FINAL SURVEY

Projected Bottom Hole Location
12676'MD 6981'TVD 155'S & 6073'E of SHL
90.5 degree Incl @ 87.9 degree AZM



Lofland 22T-HZ Pad Sec.22-T5N-R65W Lofland 22T-402 Wellbore #1 10:04, January 27 2014	ANNOTATIONS
	No annotation data is available.
LEGEND	
Lofland 22T-402, Wellbore #1, Plan #2 (1-02-14) V0	
Wellbore #1	
Survey #1	



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R65W

Lofland 22T-HZ Pad Sec.22-T5N-R65W

Lofland 22T-402

Wellbore #1

Survey: Survey #1

Standard Survey Report

27 January, 2014

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22T-402
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4663.0ft (Ensign Rig #14 - RKB - 15')
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4663.0ft (Ensign Rig #14 - RKB - 15')
Well:	Lofland 22T-402	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.22-T5N-R65W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Lofland 22T-HZ Pad Sec.22-T5N-R65W				
Site Position:		Northing:	1,381,877.65 ft	Latitude:	40.378500
From:	Lat/Long	Easting:	3,238,329.12 ft	Longitude:	-104.644530
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.55 °

Well	Lofland 22T-402					
Well Position	+N-S	0.0 ft	Northing:	1,381,862.82 ft	Latitude:	40.378460
	+E-W	0.0 ft	Easting:	3,238,304.19 ft	Longitude:	-104.644620
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,648.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/2/2014	8.45	66.96	52,865

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	91.57	

Survey Program	Date	1/27/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
124.0	12,676.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
1.0	0.00	208.10	1.0	0.0	0.0	0.0	0.00	0.00	0.00	
SHL 344'FSL, 1313'FEL, SEC.22										
1.4	0.00	208.10	1.4	0.0	0.0	0.0	0.00	0.00	0.00	
LEASE LINE										
124.0	0.20	208.10	124.0	-0.2	-0.1	-0.1	0.16	0.16	0.00	
218.0	0.50	154.50	218.0	-0.7	0.0	0.0	0.44	0.32	-57.02	
344.0	0.40	142.40	344.0	-1.6	0.5	0.5	0.11	-0.08	-9.60	
504.0	0.20	306.20	504.0	-1.8	0.6	0.7	0.37	-0.13	102.38	
661.0	0.40	269.00	661.0	-1.7	-0.2	-0.1	0.17	0.13	-23.69	
818.0	0.50	239.60	818.0	-2.0	-1.3	-1.2	0.16	0.06	-18.73	
863.0	0.50	237.80	863.0	-2.2	-1.6	-1.6	0.03	0.00	-4.00	

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Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4663.0ft (Ensign Rig #14 - RKB - 15')
Well:	Lofland 22T-402	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
938.0	0.40	228.00	938.0	-2.6	-2.1	-2.0	0.17	-0.13	-13.07
1,102.0	0.50	260.30	1,102.0	-3.1	-3.2	-3.1	0.16	0.06	19.70
1,255.0	0.20	40.10	1,255.0	-3.0	-3.7	-3.6	0.43	-0.20	91.37
1,411.0	0.50	293.90	1,411.0	-2.5	-4.2	-4.1	0.38	0.19	-68.08
1,564.0	0.80	319.60	1,564.0	-1.4	-5.5	-5.4	0.27	0.20	16.80
1,718.0	1.80	302.70	1,717.9	0.7	-8.2	-8.2	0.69	0.65	-10.97
1,872.0	1.80	302.20	1,871.8	3.3	-12.3	-12.4	0.01	0.00	-0.32
2,026.0	1.80	279.20	2,025.8	5.0	-16.7	-16.8	0.47	0.00	-14.94
2,182.0	1.80	262.50	2,181.7	5.0	-21.6	-21.7	0.34	0.00	-10.71
2,339.0	2.00	230.50	2,338.6	3.0	-26.1	-26.2	0.68	0.13	-20.38
2,493.0	4.40	185.80	2,492.4	-4.6	-28.8	-28.7	2.14	1.56	-29.03
2,620.0	4.20	187.60	2,619.0	-14.1	-29.9	-29.5	0.19	-0.16	1.42
2,779.0	5.80	170.50	2,777.4	-27.8	-29.3	-28.6	1.36	1.01	-10.75
2,938.0	5.60	164.50	2,935.6	-43.2	-25.9	-24.7	0.40	-0.13	-3.77
3,097.0	5.90	138.70	3,093.9	-56.8	-18.5	-16.9	1.62	0.19	-16.23
3,256.0	4.90	137.50	3,252.2	-67.9	-8.5	-6.6	0.63	-0.63	-0.75
3,414.0	5.10	119.20	3,409.6	-76.3	2.2	4.3	1.01	0.13	-11.58
3,567.0	4.20	126.00	3,562.1	-82.9	12.7	14.9	0.69	-0.59	4.44
3,726.0	4.70	139.10	3,720.6	-91.3	21.6	24.1	0.71	0.31	8.24
3,884.0	5.70	144.50	3,877.9	-102.6	30.4	33.2	0.70	0.63	3.42
4,042.0	4.50	144.30	4,035.3	-114.0	38.6	41.7	0.76	-0.76	-0.13
4,205.0	3.30	134.70	4,197.9	-122.5	45.7	49.0	0.84	-0.74	-5.89
4,365.0	3.10	129.60	4,357.7	-128.5	52.3	55.8	0.22	-0.13	-3.19
4,523.0	0.90	103.20	4,515.6	-131.5	56.8	60.4	1.47	-1.39	-16.71
4,681.0	1.10	57.30	4,673.6	-131.0	59.3	62.8	0.51	0.13	-29.05
4,839.0	1.40	50.10	4,831.5	-128.9	62.0	65.5	0.21	0.19	-4.56
4,998.0	0.50	163.70	4,990.5	-128.3	63.7	67.2	1.05	-0.57	71.45
5,156.0	0.40	158.20	5,148.5	-129.5	64.1	67.6	0.07	-0.06	-3.48
5,314.0	0.10	305.90	5,306.5	-129.9	64.2	67.7	0.31	-0.19	93.48
5,473.0	0.20	102.10	5,465.5	-129.9	64.4	67.9	0.19	0.06	98.24
5,631.0	0.50	211.50	5,623.5	-130.5	64.3	67.8	0.38	0.19	69.24
5,788.0	0.40	254.70	5,780.5	-131.3	63.4	67.0	0.22	-0.06	27.52
5,947.0	0.50	251.40	5,939.5	-131.6	62.2	65.8	0.06	0.06	-2.08
6,105.0	0.80	243.60	6,097.5	-132.3	60.6	64.2	0.20	0.19	-4.94
6,200.0	0.30	224.50	6,192.5	-132.8	59.8	63.4	0.55	-0.53	-20.11
6,232.0	0.10	207.30	6,224.5	-132.9	59.7	63.3	0.65	-0.63	-53.75
6,263.0	2.40	88.60	6,255.5	-132.9	60.3	64.0	7.90	7.42	-382.90
6,295.0	6.20	87.00	6,287.4	-132.8	62.7	66.4	11.88	11.88	-5.00
6,327.0	10.00	87.40	6,319.0	-132.6	67.2	70.9	11.88	11.88	1.25
6,358.0	13.10	89.00	6,349.4	-132.4	73.4	77.1	10.05	10.00	5.16
6,390.0	15.10	92.10	6,380.4	-132.5	81.2	84.8	6.68	6.25	9.69
6,422.0	16.40	93.20	6,411.2	-132.9	89.9	93.5	4.17	4.06	3.44
6,454.0	17.80	92.60	6,441.8	-133.4	99.3	102.9	4.41	4.38	-1.88
6,485.0	20.00	90.40	6,471.2	-133.6	109.4	113.0	7.46	7.10	-7.10
6,517.0	23.10	89.10	6,500.9	-133.6	121.1	124.7	9.80	9.69	-4.06
6,549.0	26.10	90.20	6,530.0	-133.5	134.4	138.0	9.48	9.38	3.44
6,580.0	27.90	91.20	6,557.6	-133.7	148.5	152.1	5.99	5.81	3.23
6,613.0	30.00	93.00	6,586.5	-134.3	164.5	168.1	6.89	6.36	5.45
6,644.0	32.30	93.40	6,613.0	-135.2	180.5	184.1	7.45	7.42	1.29
6,676.0	34.10	93.70	6,639.8	-136.2	197.9	201.6	5.65	5.63	0.94
6,708.0	35.00	90.40	6,666.2	-136.9	216.1	219.8	6.49	2.81	-10.31
6,740.0	36.70	90.50	6,692.1	-137.0	234.8	238.5	5.32	5.31	0.31
6,772.0	38.60	91.10	6,717.4	-137.3	254.4	258.0	6.05	5.94	1.88
6,804.0	41.70	93.00	6,741.9	-138.1	275.0	278.7	10.42	9.69	5.94

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Well:	Lofland 22T-402	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,835.0	45.10	91.90	6,764.4	-139.0	296.3	300.0	11.24	10.97	-3.55
6,867.0	47.80	91.90	6,786.5	-139.7	319.4	323.1	8.44	8.44	0.00
6,899.0	49.10	91.80	6,807.7	-140.5	343.4	347.1	4.07	4.06	-0.31
6,931.0	51.50	91.20	6,828.1	-141.1	368.0	371.7	7.64	7.50	-1.88
6,962.0	54.00	91.20	6,846.9	-141.7	392.6	396.4	8.06	8.06	0.00
6,994.0	56.70	90.50	6,865.1	-142.1	419.0	422.7	8.63	8.44	-2.19
7,026.0	58.40	90.40	6,882.2	-142.3	446.0	449.7	5.32	5.31	-0.31
7,057.0	60.10	90.40	6,898.1	-142.5	472.6	476.3	5.48	5.48	0.00
7,089.0	62.30	90.50	6,913.5	-142.7	500.6	504.4	6.88	6.88	0.31
7,121.0	64.20	91.10	6,927.9	-143.1	529.2	532.9	6.17	5.94	1.88
7,152.0	66.70	92.10	6,940.8	-143.9	557.4	561.1	8.58	8.06	3.23
7,184.0	69.90	91.90	6,952.6	-144.9	587.1	590.9	10.02	10.00	-0.63
7,216.0	72.90	91.90	6,962.8	-145.9	617.4	621.2	9.38	9.38	0.00
7,247.0	76.10	91.90	6,971.1	-146.9	647.3	651.1	10.32	10.32	0.00
7,279.0	79.60	91.90	6,977.8	-147.9	678.5	682.3	10.94	10.94	0.00
7,305.0	82.01	92.09	6,982.0	-148.8	704.2	708.0	9.31	9.29	0.71
7"									
7,307.0	82.20	92.10	6,982.3	-148.9	706.2	710.0	9.31	9.29	0.71
7,349.0	85.80	93.00	6,986.7	-150.8	747.9	751.7	8.83	8.57	2.14
7,379.0	86.30	92.80	6,988.7	-152.3	777.8	781.7	1.79	1.67	-0.67
7,410.0	86.80	92.30	6,990.6	-153.6	808.7	812.6	2.28	1.61	-1.61
7,440.0	87.00	91.80	6,992.2	-154.7	838.6	842.6	1.79	0.67	-1.67
7,471.0	87.10	91.10	6,993.8	-155.5	869.6	873.5	2.28	0.32	-2.26
7,501.0	87.60	90.90	6,995.2	-156.0	899.5	903.5	1.79	1.67	-0.67
7,532.0	87.90	90.90	6,996.4	-156.5	930.5	934.5	0.97	0.97	0.00
7,562.0	88.00	90.40	6,997.5	-156.9	960.5	964.4	1.70	0.33	-1.67
7,592.0	88.20	90.20	6,998.5	-157.0	990.5	994.4	0.94	0.67	-0.67
7,623.0	88.80	90.20	6,999.3	-157.1	1,021.5	1,025.4	1.94	1.94	0.00
7,654.0	88.70	89.70	7,000.0	-157.1	1,052.5	1,056.4	1.64	-0.32	-1.61
7,684.0	89.30	89.70	7,000.5	-156.9	1,082.4	1,086.3	2.00	2.00	0.00
7,715.0	89.60	89.80	7,000.8	-156.8	1,113.4	1,117.3	1.02	0.97	0.32
7,745.0	89.20	89.80	7,001.1	-156.7	1,143.4	1,147.3	1.33	-1.33	0.00
7,776.0	89.40	89.10	7,001.5	-156.4	1,174.4	1,178.3	2.35	0.65	-2.26
7,806.0	89.30	88.40	7,001.8	-155.7	1,204.4	1,208.3	2.36	-0.33	-2.33
7,836.0	89.40	88.40	7,002.2	-154.9	1,234.4	1,238.2	0.33	0.33	0.00
7,866.0	89.10	88.40	7,002.6	-154.1	1,264.4	1,268.2	1.00	-1.00	0.00
7,897.0	88.40	88.80	7,003.2	-153.3	1,295.4	1,299.1	2.60	-2.26	1.29
7,927.0	87.70	88.80	7,004.3	-152.7	1,325.4	1,329.1	2.33	-2.33	0.00
7,958.0	87.60	89.10	7,005.5	-152.1	1,356.3	1,360.0	1.02	-0.32	0.97
7,988.0	88.10	89.10	7,006.7	-151.6	1,386.3	1,389.9	1.67	1.67	0.00
8,018.0	88.00	89.50	7,007.7	-151.3	1,416.3	1,419.9	1.37	-0.33	1.33
8,049.0	88.50	89.10	7,008.6	-150.9	1,447.3	1,450.9	2.07	1.61	-1.29
8,079.0	89.30	89.00	7,009.2	-150.4	1,477.3	1,480.8	2.69	2.67	-0.33
8,109.0	89.70	89.00	7,009.5	-149.9	1,507.3	1,510.8	1.33	1.33	0.00
8,139.0	90.70	88.80	7,009.4	-149.3	1,537.2	1,540.8	3.40	3.33	-0.67
8,170.0	91.60	89.00	7,008.7	-148.7	1,568.2	1,571.7	2.97	2.90	0.65
8,200.0	91.50	88.40	7,007.9	-148.0	1,598.2	1,601.7	2.03	-0.33	-2.00
8,230.0	90.20	87.60	7,007.5	-147.0	1,628.2	1,631.6	5.09	-4.33	-2.67
8,261.0	90.00	87.40	7,007.4	-145.6	1,659.2	1,662.5	0.91	-0.65	-0.65
8,291.0	90.00	87.60	7,007.4	-144.3	1,689.1	1,692.5	0.67	0.00	0.67
8,321.0	90.60	87.90	7,007.3	-143.1	1,719.1	1,722.4	2.24	2.00	1.00
8,352.0	91.20	88.80	7,006.8	-142.2	1,750.1	1,753.3	3.49	1.94	2.90
8,382.0	91.50	89.70	7,006.1	-141.9	1,780.1	1,783.3	3.16	1.00	3.00

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8,413.0	91.30	89.50	7,005.3	-141.6	1,811.1	1,814.3	0.91	-0.65	-0.65
8,443.0	91.20	89.50	7,004.7	-141.4	1,841.1	1,844.3	0.33	-0.33	0.00
8,474.0	90.20	89.30	7,004.3	-141.1	1,872.1	1,875.2	3.29	-3.23	-0.65
8,504.0	89.40	89.00	7,004.4	-140.6	1,902.1	1,905.2	2.85	-2.67	-1.00
8,535.0	90.00	89.00	7,004.5	-140.1	1,933.1	1,936.2	1.94	1.94	0.00
8,565.0	89.80	89.00	7,004.6	-139.5	1,963.0	1,966.1	0.67	-0.67	0.00
8,595.0	89.60	89.50	7,004.8	-139.1	1,993.0	1,996.1	1.80	-0.67	1.67
8,625.0	89.20	90.40	7,005.1	-139.1	2,023.0	2,026.1	3.28	-1.33	3.00
8,656.0	88.50	90.90	7,005.7	-139.5	2,054.0	2,057.1	2.77	-2.26	1.61
8,686.0	88.00	90.50	7,006.6	-139.8	2,084.0	2,087.1	2.13	-1.67	-1.33
8,717.0	88.10	90.40	7,007.7	-140.1	2,115.0	2,118.0	0.46	0.32	-0.32
8,748.0	88.40	90.20	7,008.6	-140.2	2,146.0	2,149.0	1.16	0.97	-0.65
8,780.0	88.80	89.80	7,009.4	-140.2	2,178.0	2,181.0	1.77	1.25	-1.25
8,812.0	88.70	90.20	7,010.1	-140.2	2,210.0	2,213.0	1.29	-0.31	1.25
8,843.0	88.60	90.90	7,010.8	-140.5	2,241.0	2,244.0	2.28	-0.32	2.26
8,875.0	88.50	90.20	7,011.6	-140.9	2,272.9	2,276.0	2.21	-0.31	-2.19
8,907.0	88.50	89.70	7,012.5	-140.8	2,304.9	2,307.9	1.56	0.00	-1.56
8,938.0	89.30	90.90	7,013.1	-141.0	2,335.9	2,338.9	4.65	2.58	3.87
8,970.0	89.70	91.10	7,013.3	-141.5	2,367.9	2,370.9	1.40	1.25	0.63
9,002.0	89.80	91.10	7,013.5	-142.2	2,399.9	2,402.9	0.31	0.31	0.00
9,033.0	89.80	91.10	7,013.6	-142.8	2,430.9	2,433.9	0.00	0.00	0.00
9,065.0	90.30	91.20	7,013.6	-143.4	2,462.9	2,465.9	1.59	1.56	0.31
9,097.0	90.70	91.60	7,013.3	-144.2	2,494.9	2,497.9	1.77	1.25	1.25
9,129.0	90.50	91.80	7,012.9	-145.1	2,526.9	2,529.9	0.88	-0.63	0.63
9,160.0	90.10	91.40	7,012.8	-146.0	2,557.9	2,560.9	1.82	-1.29	-1.29
9,192.0	90.30	91.40	7,012.7	-146.8	2,589.8	2,592.9	0.63	0.63	0.00
9,224.0	90.80	91.60	7,012.4	-147.6	2,621.8	2,624.9	1.68	1.56	0.63
9,256.0	91.50	92.30	7,011.7	-148.7	2,653.8	2,656.9	3.09	2.19	2.19
9,287.0	91.50	92.10	7,010.9	-149.9	2,684.8	2,687.9	0.64	0.00	-0.65
9,319.0	91.10	91.80	7,010.2	-151.0	2,716.8	2,719.9	1.56	-1.25	-0.94
9,351.0	90.90	91.10	7,009.6	-151.8	2,748.7	2,751.9	2.27	-0.63	-2.19
9,383.0	90.70	90.70	7,009.2	-152.3	2,780.7	2,783.9	1.40	-0.63	-1.25
9,415.0	89.90	90.20	7,009.0	-152.5	2,812.7	2,815.9	2.95	-2.50	-1.56
9,446.0	88.70	89.70	7,009.4	-152.5	2,843.7	2,846.8	4.19	-3.87	-1.61
9,478.0	88.90	89.10	7,010.1	-152.2	2,875.7	2,878.8	1.98	0.63	-1.88
9,510.0	89.30	89.30	7,010.6	-151.7	2,907.7	2,910.8	1.40	1.25	0.63
9,541.0	89.70	89.50	7,010.8	-151.4	2,938.7	2,941.8	1.44	1.29	0.65
9,573.0	89.70	89.00	7,011.0	-151.0	2,970.7	2,973.7	1.56	0.00	-1.56
9,605.0	89.60	88.30	7,011.2	-150.2	3,002.7	3,005.7	2.21	-0.31	-2.19
9,637.0	90.10	88.40	7,011.3	-149.3	3,034.7	3,037.6	1.59	1.56	0.31
9,668.0	90.70	88.80	7,011.1	-148.6	3,065.7	3,068.6	2.33	1.94	1.29
9,700.0	90.70	89.80	7,010.7	-148.2	3,097.7	3,100.6	3.12	0.00	3.13
9,732.0	90.70	90.20	7,010.3	-148.2	3,129.7	3,132.5	1.25	0.00	1.25
9,764.0	90.80	90.20	7,009.9	-148.3	3,161.7	3,164.5	0.31	0.31	0.00
9,796.0	91.00	90.20	7,009.4	-148.4	3,193.7	3,196.5	0.63	0.63	0.00
9,827.0	90.70	89.80	7,008.9	-148.4	3,224.7	3,227.5	1.61	-0.97	-1.29
9,859.0	90.70	89.30	7,008.5	-148.1	3,256.6	3,259.5	1.56	0.00	-1.56
9,891.0	90.50	88.40	7,008.2	-147.5	3,288.6	3,291.4	2.88	-0.63	-2.81
9,922.0	90.30	89.50	7,008.0	-146.9	3,319.6	3,322.4	3.61	-0.65	3.55
9,954.0	90.60	91.10	7,007.7	-147.1	3,351.6	3,354.4	5.09	0.94	5.00
9,986.0	91.40	92.10	7,007.2	-148.0	3,383.6	3,386.4	4.00	2.50	3.13
10,018.0	91.80	92.10	7,006.3	-149.2	3,415.6	3,418.4	1.25	1.25	0.00
10,050.0	91.70	92.30	7,005.3	-150.4	3,447.5	3,450.4	0.70	-0.31	0.63
10,082.0	91.40	91.80	7,004.4	-151.5	3,479.5	3,482.4	1.82	-0.94	-1.56

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22T-402
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4663.0ft (Ensign Rig #14 - RKB - 15')
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4663.0ft (Ensign Rig #14 - RKB - 15')
Well:	Lofland 22T-402	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,113.0	91.10	91.80	7,003.7	-152.5	3,510.5	3,513.3	0.97	-0.97	0.00
10,145.0	91.40	91.80	7,003.0	-153.5	3,542.5	3,545.3	0.94	-0.94	0.00
10,177.0	92.10	91.80	7,002.1	-154.5	3,574.4	3,577.3	2.19	2.19	0.00
10,209.0	92.00	91.80	7,000.9	-155.5	3,606.4	3,609.3	0.31	-0.31	0.00
10,242.0	91.10	91.20	7,000.0	-156.4	3,639.4	3,642.3	3.28	-2.73	-1.82
10,274.0	91.00	91.10	6,999.4	-157.0	3,671.4	3,674.3	0.44	-0.31	-0.31
10,306.0	90.90	91.10	6,998.9	-157.6	3,703.3	3,706.3	0.31	-0.31	0.00
10,338.0	90.00	91.10	6,998.7	-158.3	3,735.3	3,738.3	2.81	-2.81	0.00
10,369.0	90.20	91.60	6,998.6	-159.0	3,766.3	3,769.3	1.74	0.65	1.61
10,401.0	90.50	91.40	6,998.4	-159.8	3,798.3	3,801.3	1.13	0.94	-0.63
10,434.0	90.50	91.40	6,998.1	-160.6	3,831.3	3,834.3	0.00	0.00	0.00
10,466.0	90.20	90.70	6,997.9	-161.2	3,863.3	3,866.3	2.38	-0.94	-2.19
10,498.0	90.10	90.40	6,997.8	-161.5	3,895.3	3,898.3	0.99	-0.31	-0.94
10,530.0	90.30	90.40	6,997.7	-161.7	3,927.3	3,930.3	0.63	0.63	0.00
10,562.0	90.50	90.40	6,997.5	-162.0	3,959.3	3,962.3	0.63	0.63	0.00
10,594.0	90.50	90.50	6,997.2	-162.2	3,991.3	3,994.2	0.31	0.00	0.31
10,626.0	90.70	90.90	6,996.9	-162.6	4,023.3	4,026.2	1.40	0.63	1.25
10,658.0	90.80	91.10	6,996.5	-163.2	4,055.3	4,058.2	0.70	0.31	0.63
10,690.0	90.40	90.40	6,996.1	-163.6	4,087.3	4,090.2	2.52	-1.25	-2.19
10,722.0	90.60	90.20	6,995.9	-163.8	4,119.3	4,122.2	0.88	0.63	-0.63
10,753.0	90.40	90.00	6,995.6	-163.8	4,150.3	4,153.2	0.91	-0.65	-0.65
10,786.0	90.50	90.20	6,995.3	-163.9	4,183.3	4,186.2	0.68	0.30	0.61
10,818.0	90.70	90.40	6,995.0	-164.0	4,215.3	4,218.2	0.88	0.63	0.63
10,850.0	90.70	90.50	6,994.6	-164.3	4,247.3	4,250.2	0.31	0.00	0.31
10,882.0	90.50	90.20	6,994.3	-164.5	4,279.3	4,282.2	1.13	-0.63	-0.94
10,914.0	90.70	90.20	6,993.9	-164.6	4,311.3	4,314.2	0.63	0.63	0.00
10,946.0	91.00	90.20	6,993.5	-164.7	4,343.3	4,346.1	0.94	0.94	0.00
10,979.0	90.90	90.40	6,992.9	-164.9	4,376.3	4,379.1	0.68	-0.30	0.61
11,011.0	90.70	90.00	6,992.5	-165.0	4,408.3	4,411.1	1.40	-0.63	-1.25
11,043.0	90.40	89.10	6,992.2	-164.7	4,440.3	4,443.1	2.96	-0.94	-2.81
11,076.0	90.40	88.60	6,991.9	-164.1	4,473.2	4,476.1	1.52	0.00	-1.52
11,107.0	90.20	88.60	6,991.8	-163.3	4,504.2	4,507.0	0.65	-0.65	0.00
11,139.0	90.10	88.40	6,991.7	-162.5	4,536.2	4,539.0	0.70	-0.31	-0.63
11,172.0	90.20	89.10	6,991.6	-161.8	4,569.2	4,571.9	2.14	0.30	2.12
11,204.0	90.00	90.20	6,991.5	-161.6	4,601.2	4,603.9	3.49	-0.63	3.44
11,235.0	90.00	90.50	6,991.5	-161.8	4,632.2	4,634.9	0.97	0.00	0.97
11,267.0	90.00	90.40	6,991.5	-162.0	4,664.2	4,666.9	0.31	0.00	-0.31
11,300.0	90.20	90.50	6,991.5	-162.3	4,697.2	4,699.9	0.68	0.61	0.30
11,332.0	90.30	90.40	6,991.3	-162.5	4,729.2	4,731.9	0.44	0.31	-0.31
11,364.0	90.40	90.50	6,991.1	-162.8	4,761.2	4,763.9	0.44	0.31	0.31
11,396.0	90.80	90.50	6,990.8	-163.0	4,793.2	4,795.9	1.25	1.25	0.00
11,428.0	90.80	90.50	6,990.4	-163.3	4,825.2	4,827.9	0.00	0.00	0.00
11,460.0	91.00	90.40	6,989.9	-163.6	4,857.2	4,859.9	0.70	0.63	-0.31
11,492.0	91.00	90.50	6,989.3	-163.8	4,889.2	4,891.8	0.31	0.00	0.31
11,524.0	91.10	90.70	6,988.7	-164.2	4,921.2	4,923.8	0.70	0.31	0.63
11,556.0	91.10	90.40	6,988.1	-164.5	4,953.2	4,955.8	0.94	0.00	-0.94
11,588.0	91.00	90.40	6,987.5	-164.7	4,985.2	4,987.8	0.31	-0.31	0.00
11,620.0	90.20	90.00	6,987.2	-164.8	5,017.2	5,019.8	2.80	-2.50	-1.25
11,652.0	90.00	90.00	6,987.1	-164.8	5,049.2	5,051.8	0.63	-0.63	0.00
11,684.0	90.00	89.80	6,987.1	-164.8	5,081.2	5,083.8	0.63	0.00	-0.63
11,716.0	89.80	89.70	6,987.2	-164.6	5,113.2	5,115.8	0.70	-0.63	-0.31
11,748.0	89.60	89.30	6,987.3	-164.3	5,145.2	5,147.7	1.40	-0.63	-1.25
11,781.0	90.00	89.70	6,987.5	-164.0	5,178.2	5,180.7	1.71	1.21	1.21

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22T-402
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4663.0ft (Ensign Rig #14 - RKB - 15')
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4663.0ft (Ensign Rig #14 - RKB - 15')
Well:	Lofland 22T-402	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
11,813.0	90.30	89.70	6,987.4	-163.9	5,210.2	5,212.7	0.94	0.94	0.00	
11,845.0	90.60	89.50	6,987.1	-163.7	5,242.2	5,244.7	1.13	0.94	-0.63	
11,877.0	90.80	89.50	6,986.7	-163.4	5,274.2	5,276.7	0.63	0.63	0.00	
11,909.0	90.70	89.30	6,986.3	-163.0	5,306.2	5,308.6	0.70	-0.31	-0.63	
11,941.0	90.50	89.10	6,986.0	-162.6	5,338.1	5,340.6	0.88	-0.63	-0.63	
11,973.0	90.40	88.80	6,985.7	-162.0	5,370.1	5,372.6	0.99	-0.31	-0.94	
12,005.0	89.70	89.10	6,985.7	-161.4	5,402.1	5,404.5	2.38	-2.19	0.94	
12,037.0	89.80	89.80	6,985.8	-161.1	5,434.1	5,436.5	2.21	0.31	2.19	
12,069.0	90.60	90.40	6,985.7	-161.2	5,466.1	5,468.5	3.12	2.50	1.88	
12,101.0	90.80	90.20	6,985.3	-161.3	5,498.1	5,500.5	0.88	0.63	-0.63	
12,133.0	90.50	89.70	6,985.0	-161.3	5,530.1	5,532.5	1.82	-0.94	-1.56	
12,165.0	89.90	89.50	6,984.9	-161.1	5,562.1	5,564.5	1.98	-1.88	-0.63	
12,197.0	90.10	89.70	6,984.9	-160.9	5,594.1	5,596.4	0.88	0.63	0.63	
12,229.0	90.40	90.20	6,984.7	-160.8	5,626.1	5,628.4	1.82	0.94	1.56	
12,261.0	90.70	90.20	6,984.4	-160.9	5,658.1	5,660.4	0.94	0.94	0.00	
12,293.0	90.60	90.00	6,984.1	-161.0	5,690.1	5,692.4	0.70	-0.31	-0.63	
12,324.0	90.50	89.70	6,983.8	-160.9	5,721.1	5,723.4	1.02	-0.32	-0.97	
12,356.0	90.20	89.70	6,983.6	-160.8	5,753.1	5,755.4	0.94	-0.94	0.00	
12,388.0	90.20	90.00	6,983.5	-160.7	5,785.1	5,787.3	0.94	0.00	0.94	
12,419.0	90.10	89.70	6,983.4	-160.6	5,816.1	5,818.3	1.02	-0.32	-0.97	
12,451.0	89.70	89.10	6,983.4	-160.3	5,848.1	5,850.3	2.25	-1.25	-1.88	
12,483.0	90.00	89.10	6,983.5	-159.7	5,880.1	5,882.3	0.94	0.94	0.00	
12,514.0	90.40	89.30	6,983.4	-159.3	5,911.1	5,913.3	1.44	1.29	0.65	
12,546.0	90.80	89.30	6,983.1	-158.9	5,943.1	5,945.2	1.25	1.25	0.00	
12,578.0	91.10	89.10	6,982.5	-158.5	5,975.1	5,977.2	1.13	0.94	-0.63	
12,622.0	90.50	87.90	6,981.9	-157.3	6,019.1	6,021.1	3.05	-1.36	-2.73	
12,676.0	90.50	87.90	6,981.4	-155.3	6,073.0	6,075.0	0.00	0.00	0.00	
BHL 200'FSL, 500'FEL, SEC.23										

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name		Casing Diameter (")	Hole Diameter (")
7,305.0	6,982.0	7"		7	7-1/2

Checked By: _____	Approved By: _____	Date: _____
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